Kilin-6006 Series
Communication Appliance

User's Manual

Revision: 1.2

CE

This certificate of conformity of KILIN-6006 series with actual required safety standards in accordance with 89/366 ECC-EMC Directive and LVD 73/23 ECC

UL

This product meets all safety requirements per UL60950 standard.

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ISO 9001

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Chapter 1 Introduction

1.1 About This Manual

This manual contains all required information for setting up and using the Kilin-6006 series.

Kilin-6006 provides the essential platform for delivering optimal performance and functionality in the value communications appliance market segment. This manual should familiarize you with Kilin-6006 operations and functions. Kilin-6006 series provide up to 5 on-board Ethernet ports to serve communication applications like Firewall, requiring 5 Ethernet ports to connect external network (internet), demilitarized zone and internal network.

Kilin-6006 series overview:
Kilin-6005 series overview:

- ✧ Octeon MIPS 64 31xx up to 2 Cores Of 300/400/500 MHz
- ✧ Memory: Two DDR2 DIMM slots and up to 4G
- ✧ Three Gigabit Ethernet interfaces
- ✧ Two 10M/100M Ethernet interfaces
- ✧ Independent management console(RS232) and Ethernet interface for MIPS64 system
- ✧ One PCI golden finger for PCI device connectivity.
- ✧ Two SATA Hard disks

1.2 Manual Organization

This manual describes how to configure your Kilin-6006 system to meet various operating requirements. It is divided into three chapters, with each chapter addressing the basic concept and operation of this system.

Chapter 1: Introduction. This section describes how this document is organized. It includes brief guidelines and overview to help find necessary information.

Chapter 2: Hardware Configuration Setting and Installation. This chapter demonstrated the hardware assembly procedure, including detailed information. It shows the definitions and locations of Jumpers and Connectors that can be used to configure the system.

Chapter 3: Operation Information. This section provides illustrations and information on the system architecture and how to optimize its performance.

Any updates to this manual, would be posted on the web site:

http://www.portwell.com.tw/products/ca.html

1.3 Technical Support Information

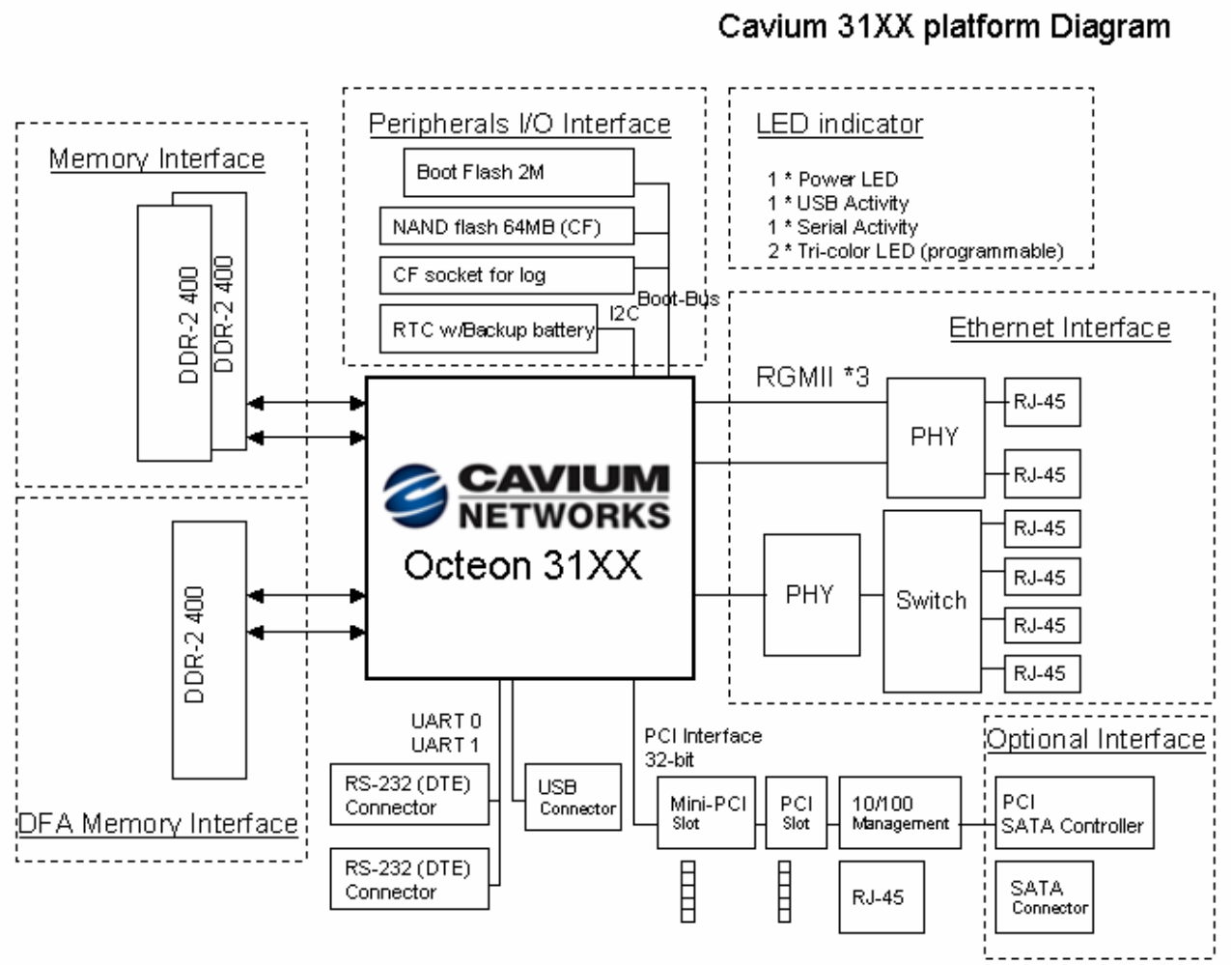
Users may find helpful tips or related information on Portwell's web site: ***http://www.portwell.com.tw*** a direct contact to Portwell's technical person is also available. For further support, users may also contact Portwell's headquarter in Taipei or local distributors.

Taipei Office Phone Number: +886-2-7731-8888

1.4 Board Layout

Figure 1-1 Board Layout of Kilin-6006 M/B

Figure 1-2 Kilin-6006 Basic Block Diagram



1.6 Product Specification

	Feature	Detailed Description
1	Processor	■ Cavium Octeon CN31xx ■ Single and Dual MIPS64, L2 Cache 256KB, Frequency 500Mhz.
2	Memory Support	■ 2x 200pin DDR2 SODIMM sockets support DDR2 400/533 Max. Capacity up to 4GB (2GB 2 Rank DIMM)On-board
3	Bypass Ethernet ports	■ Two Gigabit Ethernet ports with 1 bypass segments from RGMII interface of Octeon CN31xx with Marvell 88E1145 Ethernet PHY.
4	CF slot	■ One CF slot for Operating system ■ One CF slot for log and backup (Optional)
5	SATA channels	■ One internal SATA channel for HDD connection
6	USB	■ Support USB 2.0.
7	Ethernet ports	■ 10/100M management port (copper) using Intel 82551QM ■ 3 Gigabit Ethernet port (copper) from 31XX RGMII on CPU board.
8	H/W Reset and Load Factory Default	■ There is a pin-header for H/W reset ■ There is a pin-header on board to connect to additional push button for F/D (Load Factory Default).
9	LED	■ 1 * Power LED (Green) – in front ■ 1 * Data Activity (Red). – in front
10	System Monitoring Feature	■ The system shall monitor CPU & System Temperature and operating voltage
11	Watch Dog Timer	■ The WDT support 8 time-out intervals from 0.5 sec/Min to 64 sec/Max by s/w programming.
12	System Dimension	■ 428mm / 16.8” (W) x 44mm / 1.7” (H) x 255 mm/ 10.1”(D)
13	Environmental requirements	■ Storage temp.: -40°C to 80°C ■ Operating temp.: 5°C to 60°C. ■ Humidity: 5 to 95% RH

Chapter 2 Getting Started

This section describes how the hardware installation and system settings should be done.

2.1 Included Hardware

The following hardware is included in package:

- Kilin-6006 Communication Appliance System Board
- One null serial port cable

2.2 Before You Begin

To prevent damage to any system board, it is important to handle it with care. The following measures are generally sufficient to protect your equipment from static electricity discharge:

When handling the board, use a grounded wrist strap designed for static discharge elimination and touch a grounded metal object before removing the board from the antistatic bag. Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.

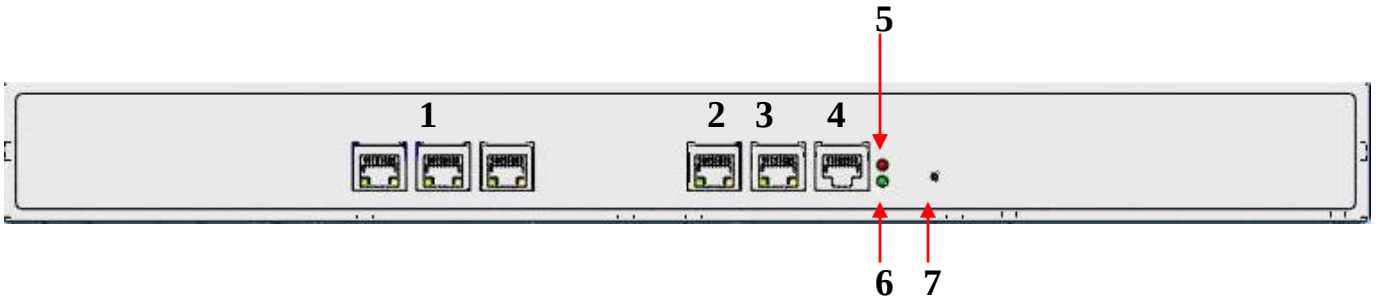
When handling processor chips or memory modules, avoid touching their pins or gold edge fingers. Restore the communications appliance system board and peripherals back into the antistatic bag when they are not in use or not installed in the chassis.

Some circuitry on the system board can continue operating even though the power is switched off. Under no circumstances should the Lithium battery cell used to power the real-time clock be allowed to be shorted. The battery cell may heat up under these conditions and present a burn hazard.

WARNING!

1. **"CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS"**
2. **This guide is for technically qualified personnel who have experience installing and configuring system boards. Disconnect the system board power supply from its power source before you connect/disconnect cables or install/remove any system board components. Failure to do this can result in personnel injury or equipment damage.**
3. **Avoid short-circuiting the lithium battery; this can cause it to superheat and cause burns if touched.**
4. **Do not operate the processor without a thermal solution. Damage to the processor can occur in seconds.**
5. **Do not block air vents. Minimum 1/2-inch clearance required.**

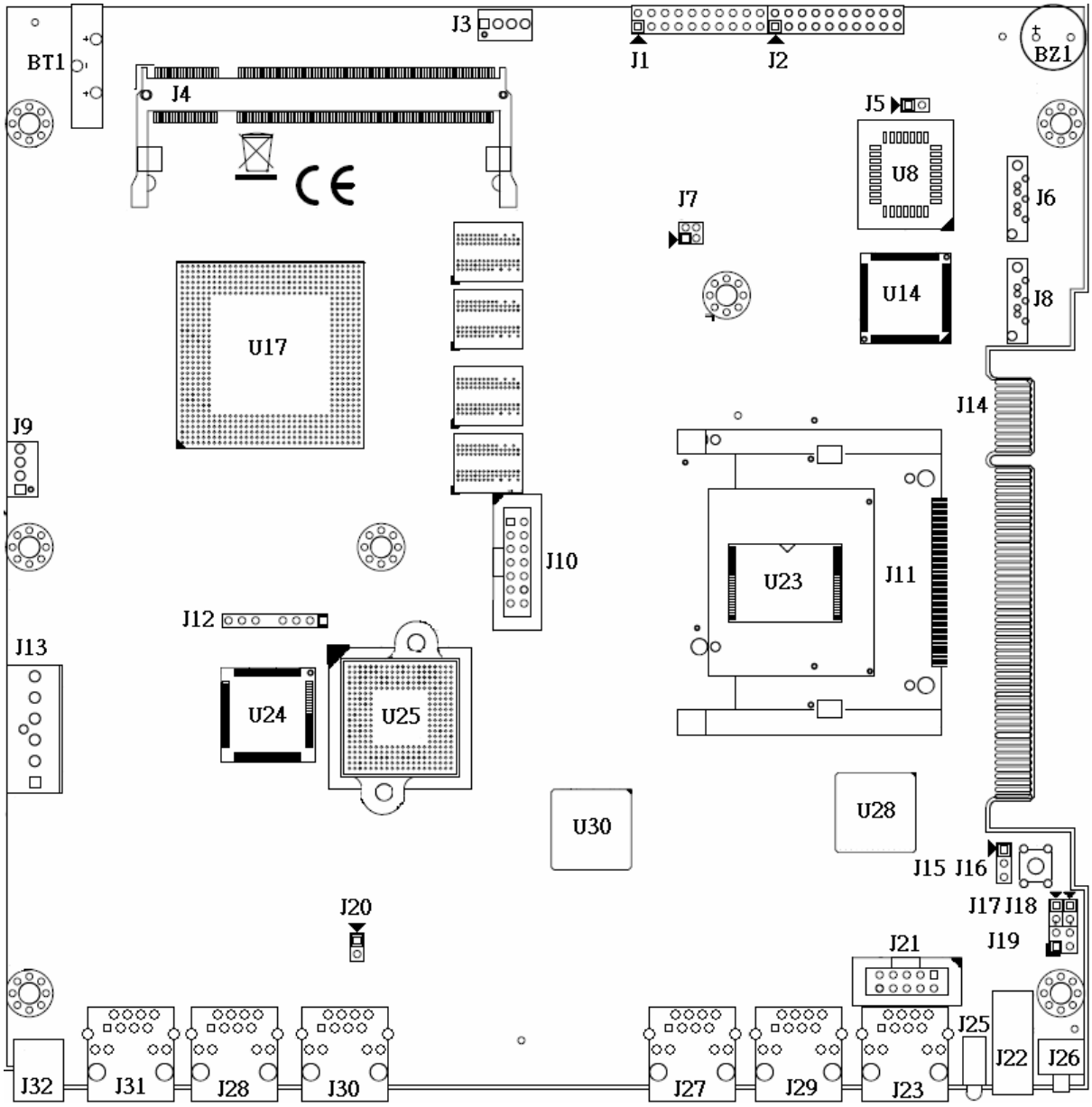
2.3.1 Kilin-6006 System Front Panel



1	RGMII Gigabit Ethernet	**5**	System Power LED
2	PCI-3210/100 Ethernet	**6**	Hard Disk LED
3	PCI-32 10/100 Ethernet	**7**	Reset button
4	Console from Octeon		

2.3.2 Kilin-6006 System Board Jumper

In general, jumpers on Kilin-6006 system board are used to select options for certain features. Some of the jumpers are configurable for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (Short) or remove (NC) it from the jumper pins according to the following instructions. Here NC stands for “Not Connected”.



Jumper Setting

The jumper settings are schematically depicted in this manual as follows:

Connector Table

Connector Reference	Function Descriptions
J1	Cavium GPIO pin Connector
J2	8 bit GPIO connector
J3/J9	System Fan / CPU Fan
J4/J33	DDR2 SO-DIMM Connector
J5	Watch Dog Enable Connector
J6/J8	SATA Connector
J7	Case Open and Temperature Connector
J10	Cavium CPU JTAG Connector
J12	Lattics CPLD JTAG Connector
J13	DC power +5V and +12V input Connector
J14	PICMG Gold finger interface
J16/J18	Load Default Button and Connector
J20	Bypass state LED Connector
J21	COM2 Port Connector
J22	USB Connector
J26	Reset Button Connector
J19/J25	Power / HD LED Connector
J28/J30/J31	10/100/1000 LAN RJ45 Connector
J27/J29	10/100 LAN RJ45 Connector
J23	Console Port Connector
J32	Power Jack DC Input
J11/J34	Compact Flash Connector

J1 Cavium bootloader selection

Pin	Signal Description
1-2 Short	Normal bootloader mode (Default)
1-2 Open	Fail-safe bootloader mode

J1 Cavium GPIO Pin Connector

Pin	Assignment	Pin	Assignment
1	OCT_GPIO_0	2	Ground
3	OCT_GPIO_1	4	OCT_GPIO_10
5	OCT_GPIO_4	6	OCT_GPIO_11
7	OCT_GPIO_5	8	OCT_GPIO_20
9	OCT_GPIO_8	10	OCT_GPIO_21
11	OCT_GPIO_9	12	OCT_GPIO_22
13	TWS_SCL	14	OCT_GPIO_23
15	TWS_SDA	16	MDI_MDC

17	Ground	18	MDI-MDIO
19	Ground	20	LOAD_DF

J2 Cavium GPIO Pin Connector

Pin	Assignment	Pin	Assignment
1	VDD_5V	2	Ground
3	VDD_5V	4	Ground
5	8Bit_IOGP07	6	8Bit_EXT_DIO07
7	8Bit_IOGP06	8	8Bit_EXT_DIO06
9	8Bit_IOGP05	10	8Bit_EXT_DIO05
11	8Bit_IOGP04	12	8Bit_EXT_DIO04
13	8Bit_IOGP03	14	8Bit_EXT_DIO03
15	8Bit_IOGP02	16	8Bit_EXT_DIO02
17	8Bit_IOGP01	18	8Bit_EXT_DIO01
19	8Bit_IOGP00	20	8Bit_EXT_DIO00

J3/J9 FAN Connector

Pin	Assignment
1	N/A
2	Fan Input
3	VDD_12V
4	Ground

Watch Dog Function Selection

Assignment	Function
1-2 Short	Enable WDT (Default)
1-2 Open	Disable WDT

J6/J8 SATA Connector

Pin	Assignment
1	Ground
2	SATA_Tx_P
3	SATA_Tx_N
4	Ground
5	SATA_Rx_N
6	SATA_Rx_P
7	Ground

J10 Cavium CPU JTAG Connector

Pin	Assignment	Pin	Assignment
1	EJTAG_TRST#	2	Ground
3	JTAG_TDI	4	Ground
5	EJTAG_TDO	6	Ground
7	JTAG_TMS	8	Ground
9	JTAG_TCK	10	Ground
11	EJTAG_Reset#	12	N/A
13	EJTAG_DINT	14	VDD_3V

J12 Lattics CPLD JTAG Connector

Pin	Assignment
1	VDD_5V
2	CPLD_TDO
3	CPLD_TDI
4	N/P
5	N/A
6	CPLD_TMS
7	CPLD_TCK
8	Ground

J13 DC Power 5V/12V Input Connector

Pin	Assignment
1	VDD_5V
2	VDD_5V
3	Ground
4	Ground
5	Ground
6	VDD_12V

J16/J18 Load Default Button and Connector

Assignment	Function
1-2 Short	Load Default
1-2 Open	N/A

J21 COM2 Port Connector

Pin	Assignment	Pin	Assignment
1	N/C	2	N/C
3	RS232_RX	4	RS232_RTS
5	RS232_TX	6	RS232_CTS
7	N/C	8	N/C
9	Ground	10	N/A

J22/J24 USB Connector

Pin	Assignment
1	USB_GND
2	USB_DATA+
3	USB_DATA-
4	USB_PWR

J26 Reset Button Connector

Assignment	Function
1-2 Short	Reset System
1-2 Open	N/A

J19/J25 H/D and Power LED Connector

Pin	Assignment
1	VDD_5V (pull up 330ohm)
2	Power LED Active Low
3	VDD_5V (pull up 330ohm)
4	H/D LED Active Low

J23 Console (COM1)Port Connector

Pin	Assignment
1	***RS232_RTS***
2	N/C
3	RS232_TX
4	N/C
5	N/C
6	RS232_RX
7	N/C
8	RS232_CTS

2.4 The Chassis

The system is integrated in a 1U chassis (***Fig. 2-1, Fig. 2-2***). On the front panel you will find five LAN ports, and one RJ45 console port.

Kilin-6006

Fig. 2-1 Front *view of the chassis*

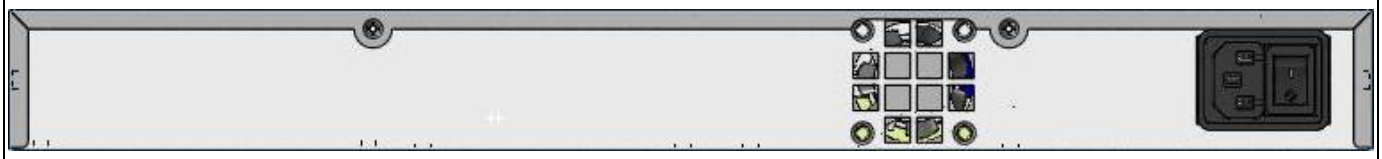


Fig. 2-2 Rear *view of the chassis*

2.5 Open the Chassis

Loosen the 6 screws of the chassis, rest two on the back, to remove the lead

The top lead can be removed from the base stand

2.6 Installing and Removing Hard Disk

The system has an internal drive bay for one 2.5" SATA hard disk drive. If the HDD is not pre-installed, you can install it by yourself.

Installing a SATA Hard Drive into a SATA Drive Carrier

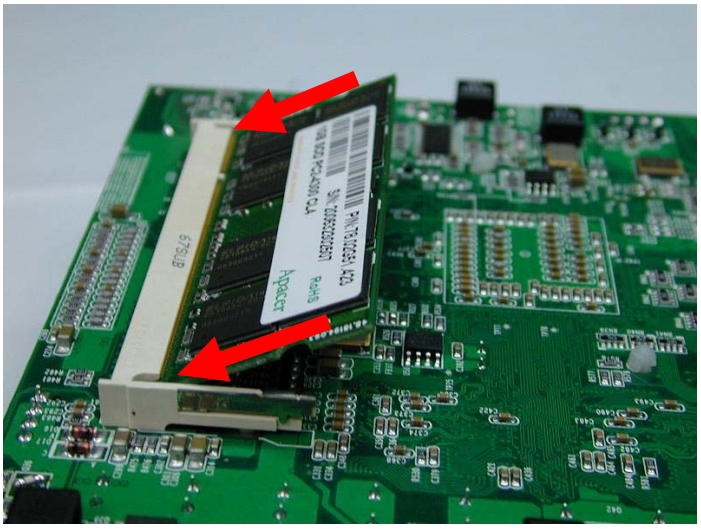
	1. Insert the SATA hard drive into the hard-drive carrier.
	2. Attach the four screws to secure the hard drive to the hard-drive carrier.

2.7 Remove and Install DIMM

Follow these steps to upgrade RAM module:

Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

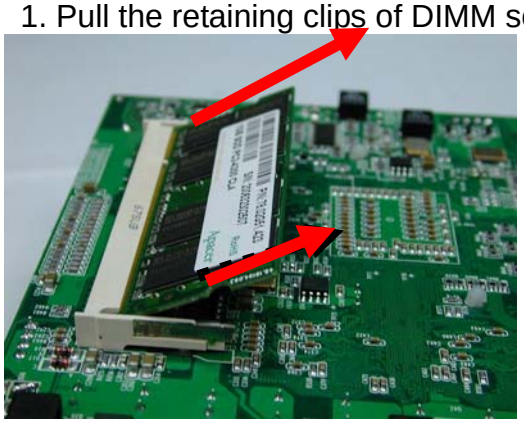
1. Obliquity inserts the DIMM into the socket and depresses DIMM until the retaining clips back in place



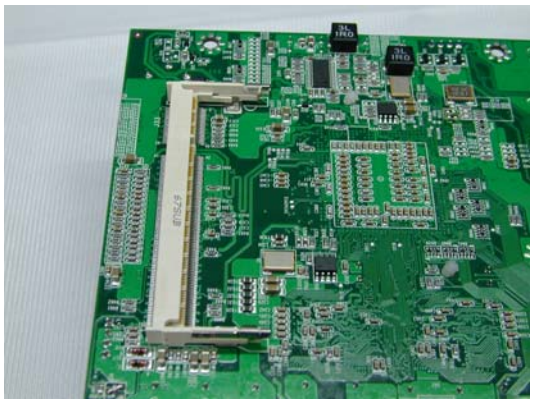
A DDR DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

Follow these steps to remove a DIMM:

1. Pull the retaining clips of DIMM socket simultaneously to unlock the DIMM



2. Remove the DIMM from the socket



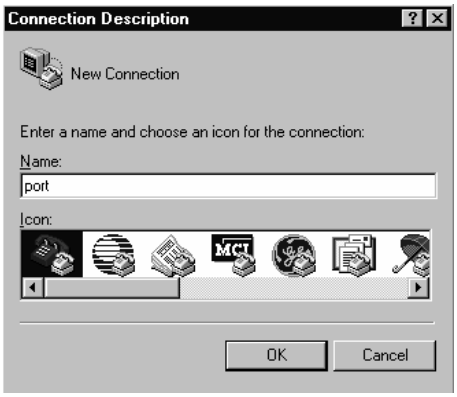
2.8 Use a Client Computer

Connection Using Hyper Terminal

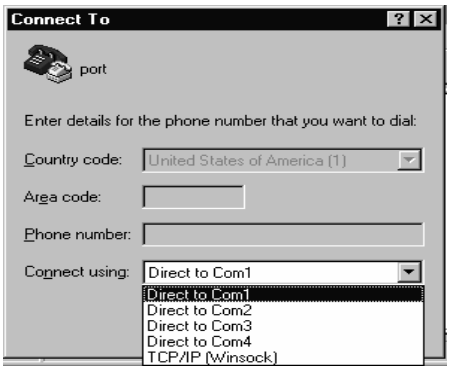
To access Kilin-6006 via the console, Hyper Terminal is one of many choices. Follow the steps below for the setup:

***Note**: Terminal software may need to update for correct console output.*

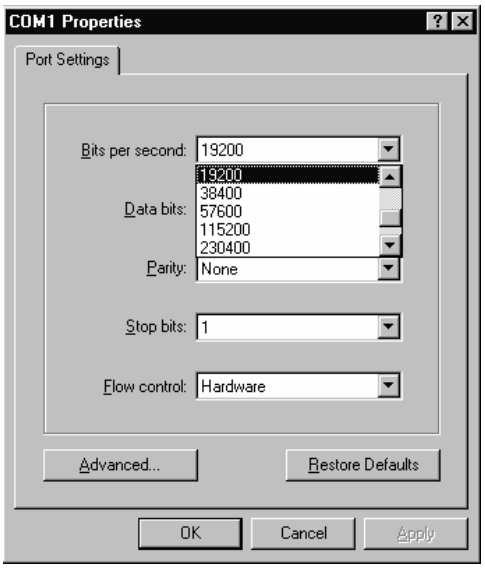
1. Execute HyperTerminal under C:\Program Files\Accessories\HyperTerminal
2. Enter a name to create new dial



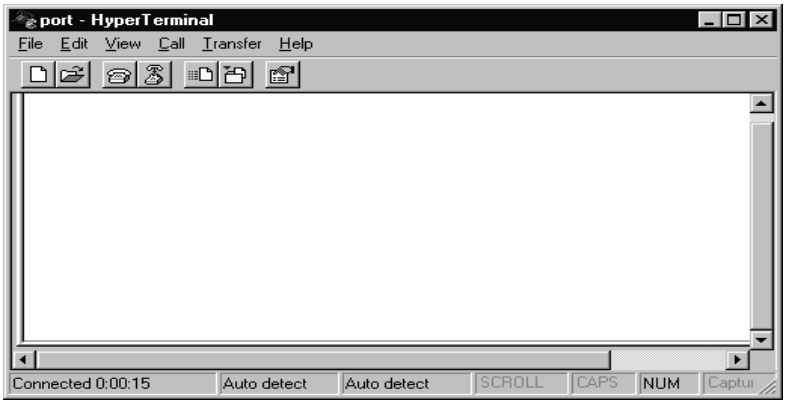
3. For the connection settings, make it Direct to Com1.



4. Please make the port settings to Baud rate 115200, Parity None, Data bits 8, Stop bits 1



5. Turn on the power of Kilin-6006 system, after following screen was shown:



This is the end of this section. If the terminal did not port correctly, please check the previous steps.

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Chapter 3 Boot-Loader Setting

3.1 Boot-Loader Information

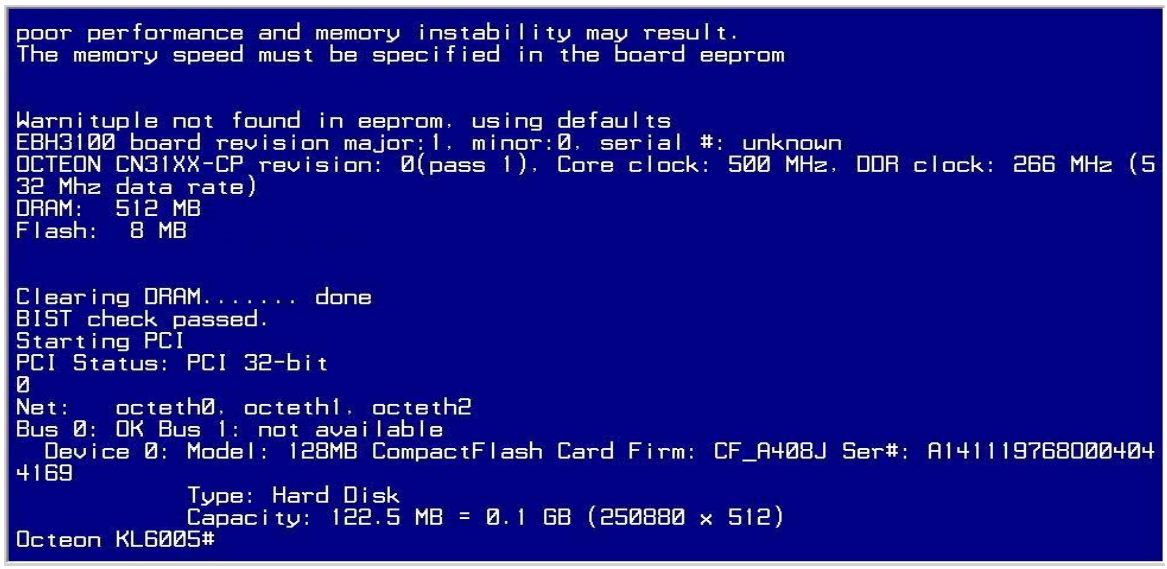
After you boot the system, the Boot-Loader information (as figure below) will appear on the screen. Key messages will be shown on screen as following

U-boot : Display the U-boot version and built time

DRAM Information : Detect the DRAM clock and size

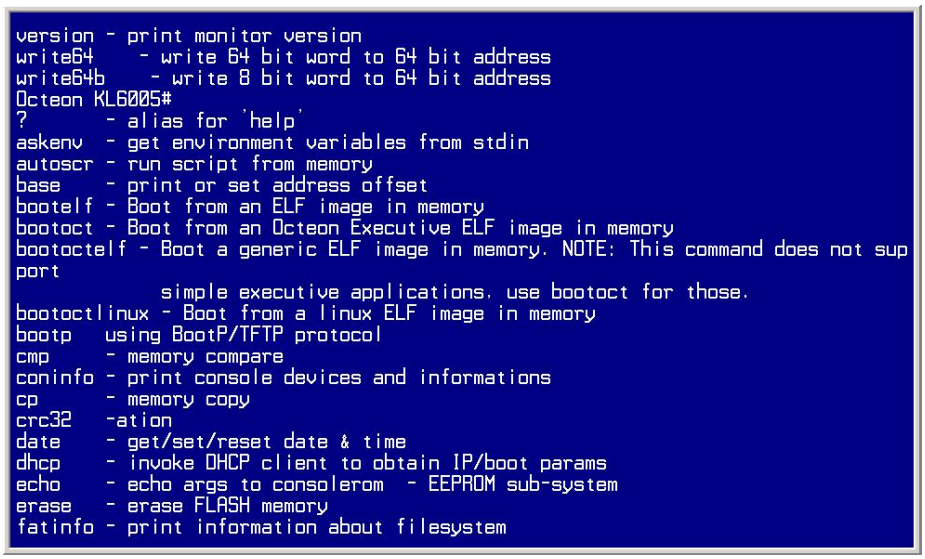
CF card Profile : Detect the CF card model and capacity

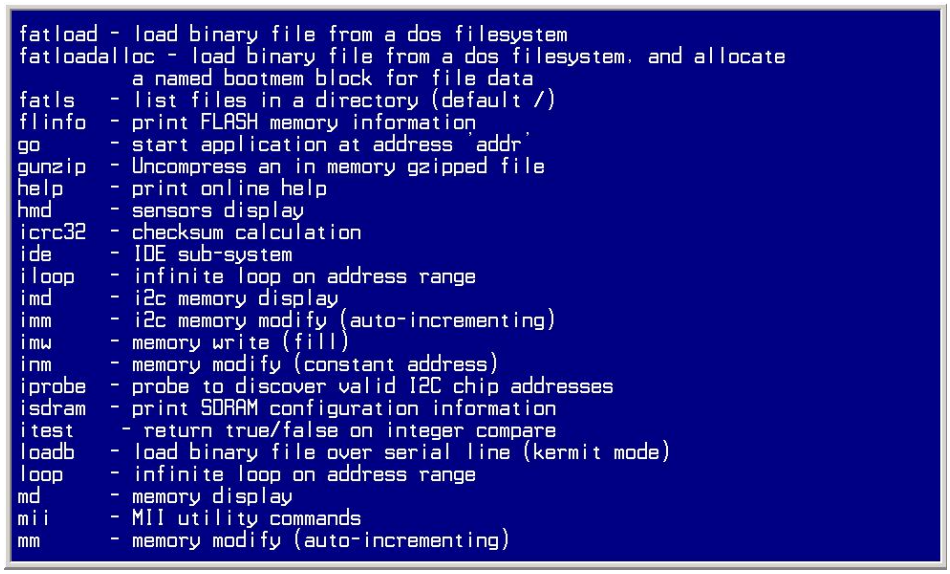
LAN : Display LAN port status of Kilin-6006 system

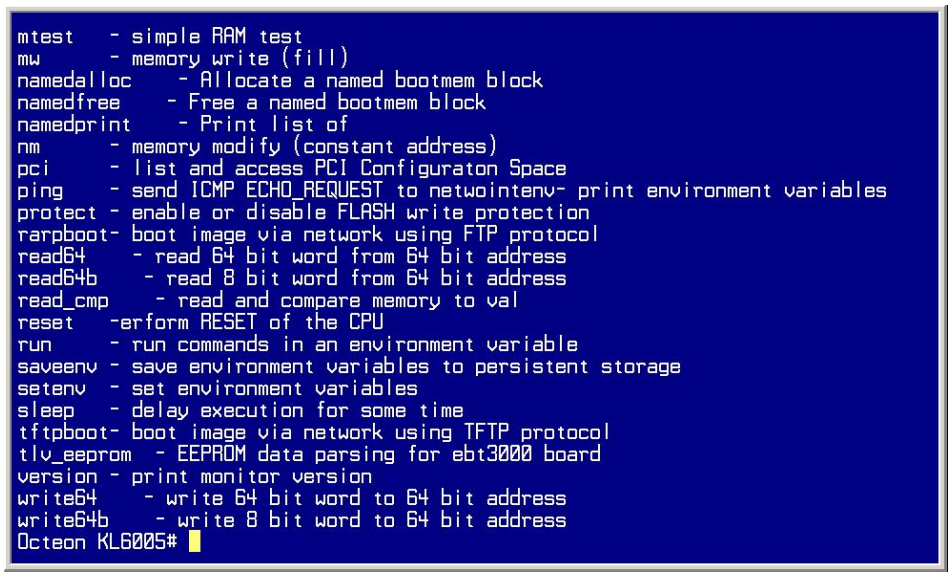

poor performance and memory instability may result.
The memory speed must be specified in the board eeprom
Warnituple not found in eeprom, using defaults
EBH3100 board revision major:1, minor:0, serial #: unknown
OCTEON CN31XX-CP revision: 0(pass 1), Core clock: 500 MHz, DDR clock: 266 MHz (5
32 Mhz data rate)
DRAM: 512 MB
Flash: 8 MB
Clearing DRAM..... done
BIST check passed.
Starting PCI
PCI Status: PCI 32-bit
0
Net: octeth0, octeth1, octeth2
Bus 0: OK Bus 1: not available
Device 0: Model: 128MB CompactFlash Card Firm: CF_A408J Ser#: A1411197680004044169
Type: Hard Disk
Capacity: 122.5 MB = 0.1 GB (250880 x 512)
Octeon KL6005#

Help menu in Boot Loader

"Help" menu is available handily by typing "help"


version - print monitor version
write64 - write 64 bit word to 64 bit address
write64b - write 8 bit word to 64 bit address
Octeon KL6005#
? - alias for 'help'
askenv - get environment variables from stdin
autoscr - run script from memory
base - print or set address offset
bootelf - Boot from an ELF image in memory
bootoct - Boot from an Octeon Executive ELF image in memory
bootoctelf - Boot a generic ELF image in memory. NOTE: This command does not support
simple executive applications, use bootoct for those.
bootoctlinux - Boot from a linux ELF image in memory
bootp using BootP/TFTP protocol
cmp - memory compare
coninfo - print console devices and informations
cp - memory copy
crc32 -ation
date - get/set/reset date & time
dhcp - invoke DHCP client to obtain IP/boot params
echo - echo args to consolerom - EEPROM sub-system
erase - erase FLASH memory
fatinfo - print information about filesystem


fatload - load binary file from a dos filesystem
fatloadalloc - load binary file from a dos filesystem, and allocate
a named bootmem block for file data
fatls - list files in a directory (default /)
flinfo - print FLASH memory information
go - start application at address 'addr'
gunzip - Uncompress an in memory gzipped file
help - print online help
hmd - sensors display
icrc32 - checksum calculation
ide - IDE sub-system
iloop - infinite loop on address range
imd - i2c memory display
imm - i2c memory modify (auto-incrementing)
imw - memory write (fill)
inm - memory modify (constant address)
iprobe - probe to discover valid I2C chip addresses
isdram - print SDRAM configuration information
itest - return true/false on integer compare
loadb - load binary file over serial line (kermit mode)
loop - infinite loop on address range
md - memory display
mii - MII utility commands
mm - memory modify (auto-incrementing)


mtest - simple RAM test
mw - memory write (fill)
namedalloc - Allocate a named bootmem block
namedfree - Free a named bootmem block
namedprint - Print list of
nm - memory modify (constant address)
pci - list and access PCI Configuraton Space
ping - send ICMP ECHO_REQUEST to netwointenv- print environment variables
protect - enable or disable FLASH write protection
rarpboot- boot image via network using FTP protocol
read64 - read 64 bit word from 64 bit address
read64b - read 8 bit word from 64 bit address
read_cmp - read and compare memory to val
reset -erform RESET of the CPU
run - run commands in an environment variable
saveenv - save environment variables to persistent storage
setenv - set environment variables
sleep - delay execution for some time
tftpboot- boot image via network using TFTP protocol
tlv_eeprom - EEPROM data parsing for ebt3000 board
version - print monitor version
write64 - write 64 bit word to 64 bit address
write64b - write 8 bit word to 64 bit address
Octeon KL6005#

3.2 Key Commands in Boot-Loader

Fatls –

Function: List files in directory

When to use: To find the file in the CF card as “dir” command

Usage : fatls <interface> <dev[:part]> [directory]

Ex: #fatls ide 0

Fatload –

Function: Load binary file from a DOS file system

When to use: Update boot-loader or running OS or running test tool

Usage : fatload <interface> <dev[:part]> <addr> <filename> [bytes]

Ex: #fatload ide 0 100000 ipfw

Bootoct –

Function: Boot from an Simple Executive ELF image in memory

When to use: Running Simple Executive

Usage : bootoct <addr> coremask=****

Ex: bootoct 100000 coremask=ffff

Bootoctl –

Function: Boot from a Linux ELF image in memory

When to use: When you need to execute Linux image

Usage : bootoctl <addr> coremask=****

Ex: bootoctl 5000000 coremask=ffff

Hmd –

Function: Sensors display (Portwell)

When to use: When you want to monitor system H/W status

Usage : #hmd

Run –

Function: Run commands in an environment variable

When to use: Want to update boot-loader or running Linux

Usage : run linux_cf or run bootloader_update

Reset –

Function: Perform reset of the CPU

When to use: Want to warm boot the system

Usage : reset

3.3 Hardware Monitor in Boot-Loader

The boot-loader support H/W monitor function

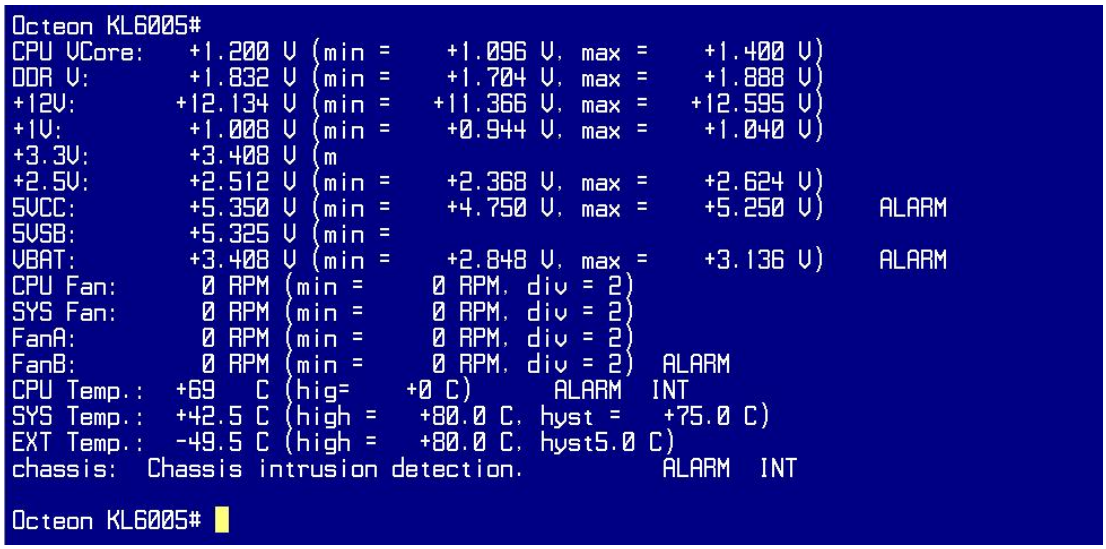
Typing “hmd” on command line then will display current H/W status of the system

FAN1; FAN2; FAN3; FAN4 can detect FAN rotational speed

Temp1 can detect CPU temperature

Temp2 can detect system temperature

Temp3 not connected thermal sensor normally


Octeon KL6005#
CPU VCore: +1.200 V (min = +1.096 V, max = +1.400 V)
DDR V: +1.832 V (min = +1.704 V, max = +1.888 V)
+12V: +12.134 V (min = +11.366 V, max = +12.595 V)
+1V: +1.008 V (min = +0.944 V, max = +1.040 V)
+3.3V: +3.408 V (m
+2.5V: +2.512 V (min = +2.368 V, max = +2.624 V)
5VCC: +5.350 V (min = +4.750 V, max = +5.250 V) ALARM
5VSB: +5.325 V (min =
VBAT: +3.408 V (min = +2.848 V, max = +3.136 V) ALARM
CPU Fan: 0 RPM (min = 0 RPM, div = 2)
SYS Fan: 0 RPM (min = 0 RPM, div = 2)
FanA: 0 RPM (min = 0 RPM, div = 2)
FanB: 0 RPM (min = 0 RPM, div = 2) ALARM
CPU Temp.: +69 C (hig= +0 C) ALARM INT
SYS Temp.: +42.5 C (high = +80.0 C, hyst = +75.0 C)
EXT Temp.: -49.5 C (high = +80.0 C, hyst5.0 C)
chassis: Chassis intrusion detection. ALARM INT
Octeon KL6005#

3.4 Boot-Loader Update

Follow below steps to update Boot-loader

A. Make sure the normal.bin file has been saved to CF card

B. Typing “#fatload ide 0 100000 normal.bin”

C. Typing “#run bootloader_flash_update”

D. After update finishe, typing “reset” and press enter

F. Boot-loader update finished